Modifying the PCS Second Report and Order to create four 20 MHz blocks while maintaining four 10 MHz blocks will encourage capital investment, foster the development of sustainable companies, and create new job opportunities in the vital telecommunications sector.

This refinement of the PCS regime will provide parties with what the *Second Report and Order* described as the "flexibility to match an applicant's specific needs with spectrum [and] should promote efficient use of the spectrum resource."

Very truly yours,

Thomas E. Wheeler

Enclosure

Building The Wireless Future

CTIA
Cellular Telecommunications Industry Association
1250 Connecticut Avenue, N.W.
Suite 200
Washington, D.C. 20036
202-785-0081 Telephone
202-331-8112 Fax
202-736-3213 Direct Dial

Thomas E. Wheeler
President / CEO

May 9, 1994

Dr. Thomas Stanley
Chief Engineer
Federal Communications Commission
2025 M Street, N.W. - Room 7002
Washington, D.C. 20554

Re: Ex Parte Filing
GEN Docket No. 90-314
Personal Communications Services

Dear Tom:

I enclose a copy of the Cellular Telecommunications Industry Association's ("CTIA") PCS White Paper Number 5, entitled *Financing the Wireless Marketplace: How Smaller Blocks of Spectrum and Geography Can Build A Better Industry.*

This White Paper calls upon the Federal Communications Commission to recognize that as technology advances the need for large spectrum blocks recedes, and that consequently delivery of Personal Communications Services (PCS) does not require blockbuster spectrum grants and geographic megamarkets.

As the White Paper notes:

MCI's recent commitment of $ 1.3 billion for a 17 percent share in NEXTEL Communications -- a company using an average of 10 MHz per market -- demonstrates the faith of investors and the financial markets in companies using small spectrum blocks.

In fact:

- **Companies actually using spectrum blocks as small as 10 MHz have demonstrated they are sufficient for advanced wireless services.**

- **A majority of parties to the PCS proceeding support smaller spectrum blocks of 20 MHz or less, citing both technical and economic reasons for these building blocks.**

- **A 10 MHz and 20 MHz allocation regime is more consistent with the Commission's mandates of competitive service delivery, technological innovation, and spectrum efficiency than the current regime.**

Modifying the PCS Second Report and Order to create four 20 MHz blocks while maintaining four 10 MHz blocks will encourage capital investment, foster the development of sustainable companies, and create new job opportunities in the vital telecommunications sector.

This refinement of the PCS regime will provide parties with what the *Second Report and Order* described as the "flexibility to match an applicant's specific needs with spectrum [and] should promote efficient use of the spectrum resource."

Very truly yours,

Thomas E. Wheeler

Enclosure

Building The Wireless Future™

CTIA
Cellular
Telecommunications
Industry Association
1250 Connecticut
Avenue, N.W.
Suite 200
Washington, D.C. 20036
202-785-0081 Telephone
202-331-8112 Fax
202-736-3213 Direct Dial

Thomas E. Wheeler
President / CEO

May 9, 1994

Mr. Ralph A. Haller
Chief, Private Radio Bureau
Federal Communications Commission
2025 M Street, N.W. - Room 5002
Washington, D.C. 20554

Re: Ex Parte Filing
GEN Docket No. 90-314
Personal Communications Services

Dear Ralph:

I enclose a copy of the Cellular Telecommunications Industry Association's ("CTIA") PCS White Paper Number 5, entitled *Financing the Wireless Marketplace: How Smaller Blocks of Spectrum and Geography Can Build A Better Industry.*

This White Paper calls upon the Federal Communications Commission to recognize that as technology advances the need for large spectrum blocks recedes, and that consequently delivery of Personal Communications Services (PCS) does not require blockbuster spectrum grants and geographic megamarkets.

As the White Paper notes:

MCI's recent commitment of $ 1.3 billion for a 17 percent share in NEXTEL Communications -- a company using an average of 10 MHz per market -- demonstrates the faith of investors and the financial markets in companies using small spectrum blocks.

In fact:

- **Companies actually using spectrum blocks as small as 10 MHz have demonstrated they are sufficient for advanced wireless services.**

- **A majority of parties to the PCS proceeding support smaller spectrum blocks of 20 MHz or less, citing both technical and economic reasons for these building blocks.**

- **A 10 MHz and 20 MHz allocation regime is more consistent with the Commission's mandates of competitive service delivery, technological innovation, and spectrum efficiency than the current regime.**

Modifying the PCS Second Report and Order to create four 20 MHz blocks while maintaining four 10 MHz blocks will encourage capital investment, foster the development of sustainable companies, and create new job opportunities in the vital telecommunications sector.

This refinement of the PCS regime will provide parties with what the *Second Report and Order* described as the "flexibility to match an applicant's specific needs with spectrum [and] should promote efficient use of the spectrum resource."

Very truly yours,

Thomas E. Wheeler

Enclosure

Building The Wireless Future

CTIA
Cellular Telecommunications Industry Association
1250 Connecticut Avenue, N.W.
Suite 200
Washington, D.C. 20036
202-785-0081 Telephone
202-785-0721 Fax

PCS WHITE PAPER No. 5
Second Series

Financing the Wireless Marketplace:

How Smaller Blocks of Spectrum and Geography

Can Build A Better Industry

May 9, 1994

Financing the Wireless Marketplace: How Smaller Blocks of Spectrum and Geography Can Build A Better Industry

In its Reconsideration of the *Second Report and Order*[1] on Personal Communications Service (PCS), the FCC should eliminate the hodgepodge of spectrum sizes and recognize that as technology advances the need for large spectrum blocks recedes.

MCI's recent commitment of $ 1.3 billion for a 17 percent share in NEXTEL Communications -- a company using an average of 10 MHz per market -- demonstrates the faith of investors and the financial markets in companies using small spectrum blocks.

In fact:

- **Companies actually using spectrum blocks as small as 10 MHz have demonstrated they are sufficient for advanced wireless services. (see p.3)**

- **A majority of parties to the PCS proceeding support smaller spectrum blocks of 20 MHz or less, citing both technical and economic reasons for these building blocks. (see p.6)**

- **A 10 MHz and 20 MHz allocation regime is more consistent with the Commission's mandates of competitive service delivery, technological innovation, and spectrum efficiency than the current regime. (see p.8)**

Modifying the PCS Second Report and Order to create four 20 MHz blocks while maintaining four 10 MHz blocks will encourage capital investment, foster the development of sustainable companies, and create new job opportunities in the vital telecommunications sector.

The Financial Markets Have Faith in Small Blocks

As Bear Stearns observed prior to the MCI-NEXTEL deal, "Over the past couple of years, Specialized Mobile Radio (SMR) has transformed itself from an overlooked player of the wireless communications world into a star at center stage"[2] -- all done with an average of 10 MHz or less of spectrum per market.

---

[1] *Second Report and Order, Amendment of the Commission's Rules to Establish New Personal Communications Services*, GEN Docket No. 90-314, 8 FCC Rcd. 7700 (1993).

[2] Bear Stearns Wireless Communications Equity Research, *Telecommunications Untethered: Our Outlook for the Wireless Communications Industry*, January 12, 1994, at p.39.

As was noted in a PCS financing conference last year, "10 MHz blocks are respectable and useful for new-service provisions."[3] As Charles Diao of Prudential Securities said, in putting a high value to NEXTEL's small spectrum blocks, "Spectrum is only worth what you do with it."[4]

Indeed, the financial markets have broadly supported the growth of SMR-based providers into Enhanced Specialized Mobile Service (ESMR). ESMR companies are winning plaudits from analysts and substantial financial backing from financial institutions, venture capitalists, and other institutional investors.[5]

Even prior to MCI's recent investment in NEXTEL, ESMR companies repeatedly won investor support. For example, CenCall's initial public offering raised more than $ 95 million in August 1993, and its total equity has a market value of over $ 1.2 billion. Dial Page won commitments from Fidelity Capital, Boston Ventures, The Hillman Company, J.P. Morgan Capital Corporation, and Fleet Equity Partners.[6] Prior to the MCI alliance, NEXTEL had raised over $ 1 billion from Comcast, Matsushita, Northern Telecom, Motorola and Nippon Telegraph and Telephone of Japan.[7] Geotek received investment commitments from George Soros and Vanguard Communications, and Motorola took substantial equity positions in CenCall, Dial Page and NEXTEL.[8]

Merrill Lynch alone has raised more than $ 1.6 billion for SMR companies.[9]

---

[3] "Venture Capitalists Hold Out Money Carrot to Bidders," *PCS News*, October 28, 1993, at p.9.

[4] *Id.*

[5] Seth Malgieri, "SMRs Becoming hot investment in 1990s wireless technology," *RCR*, November 4, 1993, at p.21. "Oppenheimer Reiterates Buy on SMR Phone Companies," *Reuters, Ltd.*, November 19, 1993. *See also* "Questar and Fidelity subsidiaries create joint wireless venture," *PR Newswire*, June 9, 1993; "Dial Page Plans to build enhanced SMR network in southeast; agrees with Fidelity to form SMR partnership; announces SMR channel acquisitions and FCC construction waiver," *PR Newswire,* June 28, 1993; "Vanguard to invest in and form strategic alliance with Geotek Industries, Inc.," *PR Newswire,* November 4, 1993.

[6] "CenCall Communications Hires Floathe Johnson and Hill and Knowlton for communications team," *PR Newswire,* November 11, 1993. "Dial Page Plans to build enhanced SMR network in southeast; agrees with Fidelity to form SMR partnership; announces SMR channel acquisitions and FCC construction waiver," *PR Newswire,* June 28, 1993.

[7] Louise Kehoe, "Dark Horse Nextel looks for a winning line - A look at a company making an impact in the U.S. cellular telephone sector," *Financial Times*, November 12, 1993, at p.24.

[8] "Motorola to Exchange Radio Dispatch Frequency Licenses in 12 states for interest in Dial Page," and "Motorola Exchanges Radio Dispatch Frequency Licenses in 17 states for interest in CenCall," *PR Newswire*, October 22, 1993. *See also* "Motorola, NEXTEL Agree to Sale of SMR Frequencies," *PR Newswire,* November 9, 1993.

[9] *See* "The Difference Between Vision and Reality," *The Wall Street Journal,* February 24, 1994, at p.C26 (insert).

Financing for PCS companies should be available from similar sources.[10] As conferences have indicated over the past year, at the very least venture capital will be available in the post-auction period, while financiers will favor experienced management teams.[11] Total venture capital available this year has been estimated around $ 3.2 billion, and the sums recently raised by Merrill Lynch indicate that bearish projections are too pessimistic.[12]

Actual Events Indicate Small Blocks Can Sustain Viable Services

Entrepreneurs experienced in the provision of wireless services, and potential users such as utilities and government agencies, have concluded that spectrum blocks of 10 MHz to 20 MHz are all that is needed to offer a PCS service. In fact, *developments in the wireless marketplace demonstrate that many companies are prepared to offer service using digital technology and such smaller blocks of spectrum.*

Justin Jaschke, President of OneComm (then CenCall Communications), made precisely these points when he met with the Commission staff on February 4, 1994. As OneComm has demonstrated, using digital technology with 10 MHz spectrum blocks provides capacity greater than analog cellular systems. Mr. Jaschke further noted that such blocks permit providers to closely align the development and deployment of systems with the demand for service, thereby avoiding spectrum warehousing and fostering the ability of new entrants to both raise capital and reach service markets.

Where is the evidence for this? **Right here.** OneComm, Dial Call (Dial Page's Specialized Mobile Radio (SMR) subsidiary), Geotek, NEXTEL, Pittencrief Communications and numerous other ESMR providers have assembled a *total* of 5 MHz to 10 MHz in each of their markets as the basis for their next generation of wireless services.

---

[10] *See e.g.*, "Venture Capitalists Hold Out Money Carrot to Bidders," *PCS News*, October 28, 1993, at p.9; "Venture Capital, Other Investment Funds Seen for Telecommunications Companies," *Telocator Bulletin*, January 14, 1994, at pp. 5-6.

[11] *See* "Obtaining Financing, Creating Business Plan Among Key Topics," *PCIA Bulletin*, March 18, 1994, at pp. 7-8.

[12] *See i.d. See also* "Venture Capitalists Hold Out Money Carrot to Bidders," *PCS News*, October 28, 1993, at p.9; "Venture Capital, Other Investment Funds Seen for Telecommunications Companies," *Telocator Bulletin*, January 14, 1994, at pp. 5-6.

For example, Dial Page's recent acquisitions in Florida will give it the equivalent of 3.5 to 5 MHz in those markets.[13] Geotek's acquisition of Metro Net Systems' 800 MHz SMR channels in New York will give Geotek an additional 3.5 MHz in the New York area, beyond its existing 900 MHz channels.[14] CenCall has acquired the equivalent of 10 MHz in the St. Louis area.[15] Pittencrief Communications has acquired between 5 MHz and 10 MHz in markets such as Oklahoma City and Dallas/Ft. Worth.[16] Companies such as Racom Corporation and American Digital Communications (formerly Mont Rouge Resources) have also begun formation of ESMR systems, using anywhere from five to 66 channels per site (the equivalent of between 250 kHz and 3.3 MHz).[17]

And *other companies are proving a broad range of services are possible for these systems.* Companies like Racotek and Gandolph Mobile Systems have proved that SMRs' frequencies can sustain viable data applications by providing data solutions to customers using SMR/ESMR networks. *Racotek provides mobile data communications services for SMR users in more than 15,000 cities across North America.*[18] Companies like Titan Mobile Data and Fujitsu Personal Systems of Santa Clara, California, are also demonstrating the viability of this market by developing hardware for wireless data applications for SMR users.[19] Motorola's MIRS technology, which underpins many SMRs, includes both voice and data

---

[13] "Dial Page to acquire systems of Advanced Radio Communications Services of Florida, Inc.," *PR Newswire,* October 25, 1993; "Motorola to exchange radio dispatch frequency licenses in 12 states for interest in Dial Page," *PR Newswire,* October 25, 1993.

[14] *Telocator Bulletin*, October 22, 1993, at p.6.

[15] "CenCall Communications Completes St. Louis Acquisitions," *PR Newswire*, January 31, 1994; *see also* Standard & Poor's, *Daily News*, November 9, 1993.

[16] *See e.g.*, "Pittencrief Communications Inc. announces purchase agreement with Industrial Radio Inc.," *Business Wire*, November 15, 1993.

[17] *Telocator Bulletin*, October 15, 1993, at pp.6-7; "American Digital Communications Inc. announces purchase of SMR system in Reno, Nev.," *PR Newswire,* January 19, 1994; "American Digital Communications Inc. announces the acquisition of SMR systems covering over 2,800 miles of interstate," *PR Newswire,* January 11, 1994.

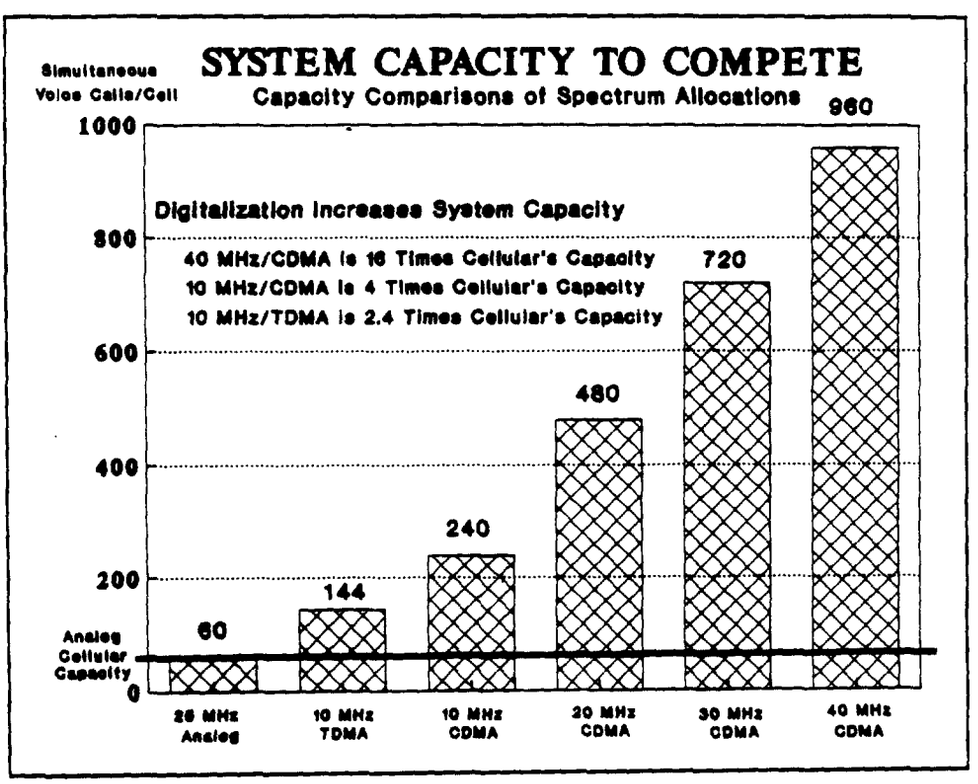
[18] Racotek's reach has recently expanded beyond these markets. *See* "Racotek and Motorola reach agreement to have Motorola representatives sell Racotek wireless data; Motorola representatives to introduce Racotek mobile data services to targeted Fortune 1000 companies," *Business Wire,* March 16, 1994.

[19] "Yearend Review: Verticals Remain Slow, But SMRs Show Promise; Omnitracs Booms," *En Route Technology,* January 17, 1994. "Fujitsu Personal Systems and ICS partnership brings wireless mobile computing to LTL trucking industry," *Business Wire*, August 23, 1993.

capabilities.[20]

The wastefulness of the Commission's 30 MHz blocks is underscored by the fact that these companies are building viable businesses around digital technology and smaller spectrum blocks of 10 MHz of spectrum or less.

This is possible because digital systems provide much greater capacity than analog cellular systems. For example, *Code Division Multiple Access* (CDMA) uses a low-power signal spread across a designated bandwidth, and assigns codes to the calls to ensure proper delivery. CDMA is estimated to increase capacity by at least ten times the capacity of analog cellular systems. *Time Division Multiple Access* (TDMA) splits a signal into pieces and, by assigning the parts to different time slots, permits a single channel to be used to deliver six simultaneous messages. Through engineering techniques, a 10 MHz TDMA system can carry *at least* 144 simultaneous voice calls compared to a 25 MHz analog cellular system's 60 calls.



[20] "Remarks by Mort Topfer, president, Motorola Land Mobile Products Sector, regarding the Nextel-Motorola agreement," *Business Wire*, November 9, 1993.

These facts should militate against overly-large allocations *as the default standard.* As the Commission has repeatedly expressed concern over spectrum efficiency, it would be inconsistent to assign spectrum without regard to efficiency in this proceeding.[21]

The Record Supports Using Building Blocks

Both the *Second Report and Order* and Commissioner Barrett's dissent noted that *the majority of commentors supported smaller spectrum blocks of 20 MHz or less.*

As NEXTEL, PowerSpectrum and other experienced wireless service providers -- and users -- have argued in the PCS proceeding, a wide range of services can be provided via spectrum-efficient technologies.

For example, in its PCS comments, NEXTEL (then Fleet Call) argued that "a 15 MHz per licensee assignment would provide each licensee more capacity than today's analog cellular systems through using spectrum conserving technologies, such as six times analog Time Division Multiple Access technology."

In its reconsideration petition, NEXTEL also pointed out that in "each of its major markets across the country, NEXTEL has less than 10 MHz of spectrum," and that "the record . . . does not identify any PCS service requiring a 30 MHz allocation."[22] NEXTEL argued that "the Commission should license PCS spectrum in 20 MHz and 10 MHz blocks, eliminating the inefficient and unjustified 30 MHz blocks."[23]

NEXTEL rebutted the argument that microwave interference justifies such large blocks by noting that "The very worst thing the Commission could do in the face of spectrum scarcity would be to permit licensees to waste 'spectral room' in solving short-term interference problems that can and should be addressed through development and deployment of advanced, spectrally-efficient technologies. . . . a mixture of 10 MHz and 20 MHz allocations will more than suffice to allow

---

[21] ***See e.g., Amendment of Part 90 of the Commission's Rules to Facilitate Future Development of SMR Systems in the 800 MHz Frequency Band***, PR Docket No. 93-144, 8 FCC Rcd 3950 at 3959 para. 37 (citing 47 U.S.C. Section 332(a)(2) for the principle that "because spectrum is a scarce resource, it is in the public interest that it be used efficiently").

[22] NEXTEL Petition for Reconsideration (PFR), filed November 18, 1993, at i.

[23] *Id.*

development of PCS to proceed while incumbent users are being relocated."[24]

The SMR provider PowerSpectrum argued in its PCS comments that:

> [T]he allocation of less spectrum per provider would encourage competition as well as promote the efficient use of the spectrum. Because PCS will be a commercial service, licensees will be encouraged to provide service to the greatest number of customers possible within their spectrum allocation. By increasing the amount of spectrum for which each entity is licensed, the Commission necessarily reduces the incentive for spectrum efficiency. Conversely, by reducing the amount of spectrum for each provider, and increasing the number of providers in a market area, the Commission will spur the use of spectrum efficient technologies.[25]

PowerSpectrum recommended "the adoption of a licensing scheme that would permit the use of between 10 and 20 MHz for each service provider," holding that "There is no reason to allocate more than 10-15 MHz of spectrum for a service provider. Proponents of advanced digital technologies, including broad band spectrum techniques, have long claimed they can perform efficiently with 10 MHz of bandwidth."[26]

City Utilities of Springfield, Missouri, argued in its PCS comments that a 10 MHz allocation would be sufficient for the provision of what it described as "utility PCS," in order to "use the data/telemetry capability of PCS to identify the locations of its bus/transit fleet and its repair and service vehicles, provide mobile alarm functions and improved service dispatching . . . [as well as] significant voice communication requirements relative to those same units."[27] As it further noted, "such utility related use would not nearly tax the capacity of even a 10 MHz PCS system."[28]

Other wireless service providers have made even more far-reaching proposals. Pass Word, Inc., a radio common carrier and private carrier paging licensee, endorsed

---

[24]NEXTEL Opposition to Petitions for Reconsideration, filed December 30, 1993, at 11-12.

[25]Comments of PowerSpectrum, filed November 9, 1992, at p.4.

[26]*Id.*

[27]Comments of City Utilities of Springfield, Missouri, filed November 9, 1992, at p.6.

[28]*Id.*

twenty licensees per area, allocating 5 MHz per licensee.[29]

Even advocates of a strategy whereby the Commission could start with large spectrum blocks and allow their disaggregation and transfer by licensees, such as Advanced MobileComm Technologies, Inc., and Digital Spread Spectrum Technologies, Inc., have affirmed that "10 MHz PCS allocations ultimately will offer effective system capacity well in excess of that available to the analog cellular systems in operations today."[30]

Keeping Faith with the Commission's Mandates and Objectives

The Commission will keep faith with its mandates to foster competition and innovative technologies, and its objective of promoting the efficient use of the spectrum resource, by using "building blocks" of 10 MHz and 20 MHz instead of tying up vast amounts of spectrum in a single license.

In fact, when it adopted the use of 20 MHz and 10 MHz spectrum blocks as part of the hodgepodge of spectrum allocations, the Commission conceded that both were sufficient for viable PCS services. And, under a "building block" approach, it will be possible for companies to acquire spectrum geared to their current needs, *as well as purchase any further building blocks they deem necessary to provide future services*. The Commission *should* permit would-be service providers to bid for spectrum blocks in whatever number as will permit them to configure their services to best advantage. But the Commission should not waste spectrum and encourage inefficiencies by allocation *unnecessarily large* spectrum blocks.

If bidders wish to acquire larger blocks, the Commission should permit them to bid for the appropriate number of 20 MHz and 10 MHz blocks.[31] *But, the Commission should not pre-suppose that even two providers will require or make the best use of 30 MHz blocks.*

The Commission should therefore adopt four 20 MHz blocks in the lower band and retain four 10 MHz blocks in the upper band, and allow prospective service providers to bid for the blocks necessary to deliver their target services. This refinement of the PCS regime will provide parties with the "flexibility to match an applicant's specific needs with spectrum [and] should promote efficient use of the

---

[29]Comments of Pass Word, filed November 10, 1992, at p.3.

[30]Joint Comments of AMT/DSST, filed January 3, 1994, at p.5.

[31]To the extent that 40 MHz is held necessary to deliver some services, the Commission should clarify that all providers may reach such a cap.

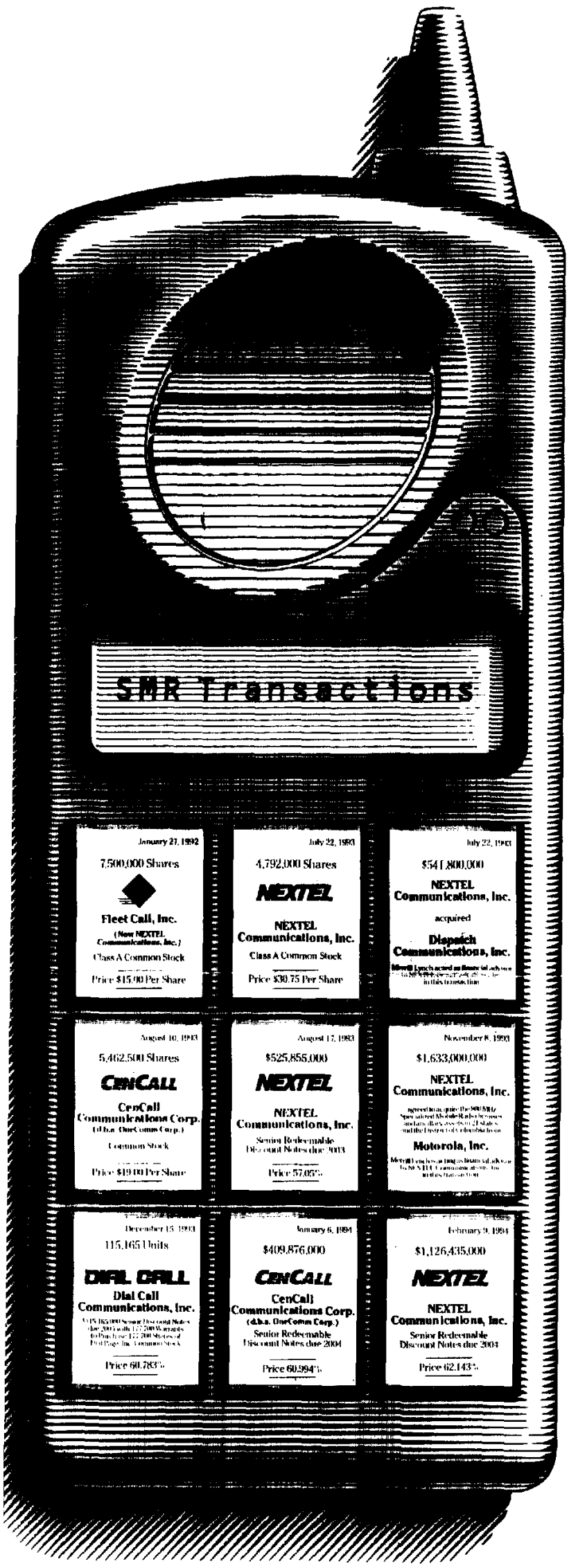
spectrum resource."[32]

Rather than adopting a policy which will require disaggregation of blocks to permit small companies and entrepreneurs to enter the market, the Commission should adopt a building block policy which will permit such companies to immediately enter the market, while not foreclosing the assembly of larger blocks of spectrum.

Such a policy will encourage capital investment, foster the development of sustainable companies, and create new job opportunities in the telecommunications marketplace.

---

[32] ***Second Report and Order*** **at para. 59.**



THE DIFFERENCE BETWEEN VISION AND REALITY

Building a state-of-the-art digital wireless network across North America required vision, innovative technology—and capital. Merrill Lynch shared that vision and has raised more than $1.6 billion for specialized mobile radio (SMR) companies—far more than any other firm.

In a few short years, the digital SMR industry has emerged as a powerful factor in telecommunications. Merrill Lynch has been there from the beginning, with the industry's first IPO, numerous debt and equity financings and strategic advice that helped these companies prosper and turn their vision into reality.

With a dedicated team of industry specialists, we provide our telecommunications clients global resources combined with local expertise. As the wireless revolution continues around the world, we remain committed to its success. For our clients, this commitment has been the difference between vision and reality.

The difference is Merrill Lynch.

Merrill Lynch

A tradition of trust.